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Research Notes : Flavonol classes of cultivars in Maturity Groups 00-IV

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Table 2

Percentage of leaf area eaten and number of petioles cut by Diabrotica speciosa in soybean varieties

Treatment	Percentage of leaf area damaged*	Number of petioles cut*
Parana	52,83 a	1,44 a
Santa Rosa	52,25 a	1,46 a
F_1 (Santa Rosa x PI 227,687)	10,52 b	0,91 b
F_1 (Parana x PI 227,687)	6,00 b	0,71 b
PI 227,687	5,01 b	0,71 b
C.V. (%)	23,20	23,50

*Means followed by the same letter do not differ significantly by the Tukey test at the 5% level.

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1) Flavonol classes of cultivars in Maturity Groups 00-IV.

Since the complementary action of Fg_1 and Fg_3 in producing kaempferol 2^G-glucosyl-gentiobioside (Buttery and Buzzell, 1975) is associated with deleterious effects on chlorophyll concentration, photosynthetic rate and yield (Buttery and Buzzell, 1976), the bringing together of these two genes in crosses may necessitate selection against the Fg_1-Fg_3-genotype in the segregating material. For example, with the cross of 'Corsoy' (Fg_1 fg_3) x 'Hawkeye' (fg_1 Fg_3) at Iowa State University, visual selection was carried out against "chlorophyll deficient" types during inbreeding in order to develop lines for a physiological study. At the time of selection it was not known that flavonol-glycoside genes were involved. Advanced lines were later classified using thin layer chromatography (Buttery and Buzzell, 1973). The distribution

of the eight flavonol classes, which should occur in approximately equal numbers, was as follows:

Class	No. of lines
1t	14
2t	15
3t	2
4t	13
5t	12
6t	14
7t	13
8t	9

Thus, visual selection was effective in eliminating most of the 3t lines but had little effect on the frequency of 1t lines. The use of a portable photometer (Macnicol et al., 1976) might make it possible to easily select against the 1t class. For example, average readings of 442, 445, and 485 (indicating increasing chlorophyll concentration) were obtained with such a "chlorophyll meter" for one 3t line, 13 1t lines, and 12 7t lines, respectively, from the above cross in 1979. However, data have not been obtained on the variation in chlorophyll concentration across the eight flavonol classes; we are developing isoline sets for 1t-8t which should allow us to make these determinations.

The opposite approach to selection against the $\underline{Fg_1}$ $\underline{Fg_3}$ combination is to plan crosses so that whenever possible $\underline{Fg_1}$ and $\underline{Fg_3}$ are not brought together. Thus, it would be desirable to develop disease-resistant lines, male-sterile lines, and other lines which are to be used frequently in crosses as $\underline{fg_1}$ $\underline{fg_3}$ genotypes. Varieties developed by hybridization, along with parental lines/varieties, are listed by $\underline{Fg_1}$ $\underline{Fg_3}$ genotype and flavonol class in Table 1 for Maturity Groups 00-IV. The approximate gene frequencies for $\underline{Fg_1}$ and $\underline{Fg_3}$ in this germplasm pool of 112 varieties/lines are 0.09 and 0.40, respectively. These frequencies are similar to the 0.10 and 0.28 reported by Buttery and Buzzell (1976) for 78 of these varieties.

Table 1

Flavonol classification of North American public soybean cultivars (Maturity Groups 00-IV) developed by hybridization and released from 1937 through 1976, plus parental lines/varieties

Class	Variety	Class	Variety
	Cultivars with Fg_1 Fg_3		
1T	Nil	1t	Nil
3T	Nil	3t	Nil
	Cultivars with Fg_1 fg_3		
2T	Provar	2t	AK (Harrow) Amsoy Chief Corsoy Evans Harcor Harosoy† Illini Wilkin
5T	Nil	5t	Nil
	Cultivars with fg_1 Fg_3		
4T	Flambeau Norchief Sac Swift Vansoy Wye C799 C1069 L49-4091 M372	4t	Adelphia Aoda Bethel Delmar HP-963 Jogun Kanro Kim Magna Morsoy Mukden Patoka Perry Prize Protana Renville Scott C1266R FC33243 L37-1355 L46-5679

Table 1 (cont'd)

Class	Variety	Class	Variety
	Cultivars with fg_1 Fg_3 (cont'd)		
7T	Manitoba Brown Midwest	7t	Blackhawk Clay Disoy Goldsoy Hark Hawkeye Kanrich Richland Seneca Verde L48-7289
	Cultivars with fg_1 fg_3		
6T	Altona Capital Clark Columbus Cutler Ford Kent Lincoln Mansoy Maple Arrow Pomona Shelby Viking Wayne Williams Woodworth C1270 052-903	6t	Acme Ada Adams Bonus Coles Comet Crest Dunfield Gibson Hardome Harosoy† Harwood Hodgson Lindarin Madison Mandarin (Ott.) Merit Norman Pagoda Portage Steele Traverse Wabash Wells C1265 L57-0034 L59-738 OX383

Table 1 (cont'd)

Class	Variety	Class	Variety
	Cultivars with fg_1 fg_3 (cont'd)		
8T	Calland	8t	Beeson
	Chippewa		Harlon
	Dunn		Harly
	Grant		Henry
	Rampage		Monroe
	Ross		
	Wirth		
	840-7-3		

†Variety is heterogeneous for two classes; in many of the varieties/lines, only a single plant was tested as being representative of the variety/line.

References

Buttery, B. R. and R. I. Buzzell. 1973. Varietal differences in leaf flavonoids of soybeans. Crop Sci. 13: 103-106.

Buttery, B. R. and R. I. Buzzell. 1975. Soybean flavonol glycosides: Identification and biochemical genetics. Can. J. Bot. 53: 219-224.

Buttery, B. R. and R. I. Buzzell. 1976. Flavonol glycoside genes and photosynthesis in soybeans. Crop Sci. 16: 547-550.

Macnicol, P. K., M. L. Dudzinski and B. N. Condon. 1976. Estimation of chlorophyll in tobacco leaves by direct photometry. Ann. Bot. 40: 143-152.

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1) Inheritance of insensitivity to long daylength.

Genetic tests for daylength insensitivity have been run using PI 297,550, reported to be day-neutral by Polson (1972), as source material. Segregating material was grown under long days at various times from 1973 to 1979, either in a growth cabinet (Buzzell et al., 1974) or in a greenhouse with daylength